



# HHS Public Access

Author manuscript

*Assessment*. Author manuscript; available in PMC 2018 March 01.

Published in final edited form as:

*Assessment*. 2017 March ; 24(2): 197–209. doi:10.1177/1073191115601218.

## Development and Validation of a State-Based Measure of Emotion Dysregulation: The State Difficulties in Emotion Regulation Scale (S-DERS)

**Jason M. Lavender\***,

Neuropsychiatric Research Institute, Fargo, ND

**Matthew T. Tull,**

Department of Psychiatry and Human Behavior, University of Mississippi Medical Center, Jackson, MS

**David DiLillo,**

Department of Psychology, University of Nebraska-Lincoln, Lincoln, NE

**Terri Messman-Moore,** and

Department of Psychology, Miami University, Oxford, OH

**Kim L. Gratz**

Department of Psychiatry and Human Behavior, University of Mississippi Medical Center, Jackson, MS

### Abstract

Existing measures of emotion dysregulation typically assess dispositional tendencies and are therefore not well-suited for study designs that require repeated assessments over brief intervals. The aim of this study was to develop and validate a state-based multidimensional measure of emotion dysregulation. Psychometric properties of the State Difficulties in Emotion Regulation Scale (S-DERS) were examined in a large representative community sample of young adult women drawn from four sites ( $N = 484$ ). Exploratory factor analysis suggested a 4-factor solution, with results supporting the internal consistency, construct validity, and predictive validity of the total scale and the four subscales: Nonacceptance (i.e., nonacceptance of current emotions), Modulate (i.e., difficulties modulating emotional and behavioral responses in the moment), Awareness (i.e., limited awareness of current emotions), and Clarity (i.e., limited clarity about current emotions). S-DERS scores were significantly associated with trait-based measures of emotion dysregulation, affect intensity/reactivity, experiential avoidance, and mindfulness, as well as measures of substance use problems. Moreover, significant associations were found between the S-DERS and state-based laboratory measures of emotional reactivity, even when controlling for the corresponding original DERS scales. Results provide preliminary support for the reliability and validity of the S-DERS as a state-based measure of emotion regulation difficulties.

---

\*Correspondence concerning this article should be addressed to Jason M. Lavender, Ph.D., Neuropsychiatric Research Institute, 120 South 8th Street, Fargo, ND 58103. Telephone: 701-365-4946. Fax: 701-293-3226. jlavender@nrifargo.com.

## Keywords

affect; emotion regulation; assessment; state measure; psychometrics

There are numerous definitions of emotion regulation in the literature. These definitions differ in several ways, including the extent to which they (a) distinguish between emotion generation and regulation, (b) emphasize the explicit versus implicit nature of emotion regulation, and (c) focus on interpersonal versus intrapersonal processes (e.g., Campos, Walle, Dahl, & Main, 2011; Gross & Feldman Barrett, 2011; Gyurak, Gross, & Etkin, 2011; Gross & Thompson, 2007; Kappas, 2011; Thompson, 1994). One clinically-relevant conceptualization of emotion regulation that has been applied in numerous areas of psychopathology research, including substance use disorders (Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007; Fox & Sinha, 2008), anxiety disorders (Mennin, McLaughlin, & Flanagan, 2009; Roemer et al., 2009), eating disorders (Lavender et al., 2014; Racine & Wildes, 2013), and personality disorders (Bornovalova et al., 2008; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006), is the multidimensional conceptualization of emotion regulation proposed by Gratz and Roemer (2004). This multidimensional model conceptualizes emotion regulation as adaptive responses to emotional distress (versus efforts to control or suppress emotional arousal), and is characterized by four dimensions: (a) flexible use of adaptive strategies to modulate (versus eliminate) the intensity and/or temporal features of an emotional response, (b) ability to resist impulsive behaviors and engage in goal-directed behaviors in the context of emotional distress, (c) emotional awareness, clarity, and acceptance, and (d) willingness to experience emotional distress in the context of pursuing meaningful activities (Gratz, 2007; Gratz & Tull, 2010). Within this framework, deficits in one or more of these dimensions are conceptualized as being indicative of the presence of emotion dysregulation, which has been theorized to play a role in the etiology and/or maintenance of various forms of psychopathology.

There are several existing measures of emotion regulation (e.g., Emotion Regulation Questionnaire [ERQ]; Gross & John, 2003) and conceptually related constructs such as distress tolerance (e.g., Distress Tolerance Scale; Simons & Gaher, 2005), mindfulness (Five Facet Mindfulness Questionnaire; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), and negative urgency (UPPS Impulsive Behavior Scale; Whiteside & Lynam, 2001). One measure, the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), is based on the multidimensional model of emotion regulation described above. The DERS and other similar emotion regulation measures assess dispositional tendencies, with instructions asking participants to rate items in terms of their average or typical experiences. However, it is likely that numerous factors, including interpersonal experiences, situational factors, cognitive processes, and even other emotional processes may influence certain aspects of emotion dysregulation within comparatively short time frames. For instance, certain difficulties with emotion regulation may be more likely to manifest in the context of particular emotional experiences (e.g., experiencing secondary emotions in response to nonacceptance of anger, losing behavioral control due to the experience of shame/guilt), in response to a particular level of affective intensity (e.g., maintaining goal-directed behavior at lower levels of negative affect, but experiencing difficulties at higher levels), or following

an aversive interpersonal experience (e.g., in the aftermath of interpersonal trauma or loss). In this way, there may be utility in conceptualizing emotion dysregulation as a more fluid construct that can vary from day-to-day and moment-to-moment, particularly in response to internal (e.g., negative self-judgments) or external (e.g., aversive social interactions) experiences.

Such a conceptualization is consistent with emerging research taking a daily or momentary approach to studying emotion regulation and associated constructs (e.g., experiential avoidance, impulsivity; Brans, Koval, Verduyn, Lim, & Kuppens, 2013; Farmer & Kashdan, 2012; O'Toole, Jensen, Fentz, Zachariae, & Hougaard, 2014; Shahar & Herr, 2011; Tan et al., 2012; Tomko et al., 2014). In particular, researchers have noted that although trait-oriented measures provide information about an individual's overall propensities within certain domains, they are limited by this general focus, which disregards the potential for variability over time and neglects the potential influence of various situational factors (de Veld, Riksen-Walraven, & de Weerth, 2012; Fleeson, 2007; Tomko et al., 2014). Indeed, in a study examining two emotion regulation strategies (i.e., suppression and reappraisal) using a version of the ERQ (Gross & John, 2003) modified to assess these strategies in a state-oriented approach, both trait-oriented characteristics and situational variables were found to influence the use of emotion regulation strategies in a given context (Egloff, Schmukle, Burns, & Schwerdtfeger, 2006, Study 1).

Notably, however, despite strong evidence suggesting the salience of momentary difficulties with regulating negative affective states in the occurrence of a variety of maladaptive behaviors (e.g., eating disorder behaviors, self-harm, substance use; e.g., Armey, Crowther, & Miller, 2011, Shiffman & Waters, 2004, Smyth et al., 2007), extant trait-based measures of emotion dysregulation do not permit the assessment of momentary emotion regulation difficulties, and there are currently no empirically supported state-based measures of these difficulties. The absence of comprehensive and well-validated measures of in-the-moment emotion dysregulation is of particular concern given the increasing use of innovative methodologies in psychopathology research that require state-based assessment approaches. For instance, studies examining changes in a given construct (e.g., affect) in response to a particular stimulus (e.g., a negative mood induction) require a measure designed to assess that construct as a state-based variable. Similarly, naturalistic-based assessment methods, such as ecological momentary assessment (which involves repeated momentary assessments in an individual's natural environment; Shiffman, Stone, & Hufford, 2008), also require the use of state-based measures. State-based assessments of emotion regulation difficulties would also have utility in the context of psychological treatments. Maladaptive efforts to modulate unwanted or aversive emotional experiences are theorized to play a central role in numerous forms of psychopathology (e.g., eating disorders, mood and anxiety disorders, borderline personality disorder, posttraumatic stress disorder, substance use disorders; e.g., Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Boden, Kulkarni, Shurick, Bonn-Miller, & Gross, 2014; Haynos & Fruzzetti, 2011; Hofmann, Sawyer, Fang, & Asnaani, 2012; Linehan, 1993, Mennin, Heimberg, Turk, & Fresco, 2002) and, as such, are an important target of interventions for these disorders (see Gratz, Weiss, & Tull, 2015). The development of an empirically-supported measure of state emotion regulation difficulties would have utility for both research (e.g., in studies investigating emotion regulation as an outcome or

mechanism of psychological treatments, or seeking to examine the factors that contribute to the use of maladaptive emotion regulation strategies) and clinical practice (e.g., providing a way to track changes in emotion regulation difficulties in response to specific stimuli over the course of treatment).

In light of the potential research and clinical utility of assessing state emotion dysregulation, and consistent with recent advances in the literature focused on state-based examinations of related constructs that have historically been assessed in a trait-like manner (e.g., impulsivity), the primary goal of the present study was to develop and provide initial validation for a state measure of emotion regulation difficulties: the State Difficulties in Emotion Regulation Scale (S-DERS). Items from the original DERS (Gratz & Roemer, 2004), which assesses individuals' typical levels of emotion dysregulation across multiple domains, were adapted and modified to assess emotion dysregulation in a momentary fashion. Although items were selected to reflect difficulties across each of the dimensions characterizing the multidimensional conceptualization of emotion dysregulation that underlies the DERS, an exploratory versus confirmatory approach was taken in light of the potential differences that could arise when assessing emotion regulation difficulties using a momentary versus trait-oriented approach. The construct validity of the new measure was subsequently examined via associations with (a) dispositional self-report measures of various constructs of clinical and theoretical relevance (e.g., mindfulness and experiential avoidance), (b) measures of substance use problems, and (c) laboratory-based measures of state negative emotional reactivity. To examine the extent to which the S-DERS adds to the understanding of state emotional responses above and beyond trait emotion dysregulation, partial correlations between the S-DERS and state emotional reactivity (controlling for the DERS) were also calculated.

## Method

### Participants

The current data were drawn from a large, multi-site, prospective study of emotion dysregulation and sexual revictimization among young adult women in the community. The larger study includes a representative community sample of 490 young adult women from four sites in the Southern and Midwestern United States (including Mississippi, Nebraska, and Ohio). Recruitment methods included advertisements for a study on "women's life experiences and adjustment" posted online and throughout the community (e.g., coffee shops, stores, churches, hospitals, colleges, clinics), in addition to random sampling from the community (i.e., using a mailing list purchased from a survey sampling company, letters were mailed to women between the ages of 18-25 who resided in the recruitment areas). The majority of participants were recruited through posted advertisements (with less than 10% of the sample at each site recruited via random sampling). Across all sites, approximately 58% of those who were eligible to participate enrolled in the study (range = 49.0% to 63.8%). The current study uses data from only the Wave 1 assessment.

Participants in the current investigation ( $N = 484$ ; 6 participants from the original sample were excluded due to missing data on the S-DERS) ranged in age from 18 to 25 years ( $M = 21.8$ ,  $SD = 2.2$ ) and were ethnically diverse (55.6% White; 32.2% African American/Black;

5.8% Latina; 2.7% Asian/Pacific Islander). With regard to educational attainment, 20.5% of participants had received their high school diploma or GED, and 74.6% had completed at least some higher education. Approximately half the participants (52.0%) were full-time students, with an additional 9.2% enrolled part-time. Most participants (83.3%) were single and never married.

### **S-DERS Content and Development**

An initial pool of 28 items for the S-DERS was developed by modifying and adapting items from the original DERS to assess various emotion regulation difficulties in a momentary fashion. For example, the original DERS items “I pay attention to how I feel” and “When I’m upset, my emotions feel overwhelming” were modified to “I am paying attention to how I feel” and “My emotions feel overwhelming”, respectively (see online supplement Table S1 for a complete list of the modified S-DERS items and corresponding original DERS items). In consideration of the utility of having briefer measures for state-based study designs, items that were very similar in wording to another item (e.g., “When I’m upset, I believe that there is nothing I can do to make myself feel better” and “When I’m upset, I know that I can find a way to eventually feel better”) were excluded to reduce scale length and redundancy. Items were specifically selected from each of the six subscales of the original DERS (i.e., nonacceptance of negative emotions [Nonacceptance], difficulties engaging in goal-directed behaviors when distressed [Goals], difficulties controlling impulsive behaviors when distressed [Impulse], limited access to emotion regulation strategies perceived as effective [Strategies], lack of emotional awareness [Awareness], and lack of emotional clarity [Clarity]) in order to best capture the multidimensional nature of the emotion dysregulation construct as conceptualized in this study. The number of items selected from each of the original DERS subscales (which range from 5 to 8 items in length) ranged from 3 to 6. The final set of 28 items administered to participants was chosen on the basis of consensus across the first, second, and last authors (JML, MTT, KLG). For each S-DERS item, participants were asked to read the statement and “indicate how much it applies to your emotions right now,” with response options ranging from 1 (not at all) to 5 (completely).

### **Laboratory Stressor Preceding S-DERS Administration**

To induce emotional distress prior to administering the S-DERS, this study used the PASAT-C (Lejuez, Kahler, & Brown, 2003), an empirically-supported laboratory stressor shown to induce emotional distress in the form of anxiety, frustration, and irritability (Brown et al., 2002; Lejuez, Kahler, & Brown, 2003). During this task, numbers are flashed sequentially on a computer screen and participants are instructed to sum the most recent number with the previous number (using the computer mouse to click on the answer). Participants must then ignore the sum and add the next number to the most recently presented number. One point is earned for each correct answer. If an incorrect answer is provided (or participants fail to provide an answer before the next number is presented), an explosion sound is played and no points are earned.

The version of the PASAT-C used here consisted of four levels, the first three of which had increasingly shorter latencies between number presentations. Because the correct answer must be provided prior to the presentation of the next number in order to obtain a point,

difficulty increases as latencies decrease. The first level (low difficulty) lasted 1 min and had a 3-s latency between number presentations; the second level (moderate difficulty) lasted 2 min and had a 2-s latency; and the third level (high difficulty) lasted 1 min and had a 1-s latency. As such, the third level is designed to make it virtually impossible for participants to provide a correct answer prior to the presentation of the next number (thereby inducing distress). Following a brief 1 min rest period to complete negative affect ratings (see below), the final level began. The final level had the same latency between number presentations as the third level (i.e., 1-s), but lasted 7 min and included an option to terminate the task. Immediately after completing this task, participants completed the S-DERS to assess state emotion regulation difficulties in response to this stressor.

In support of the construct validity of the PASAT-C as a laboratory stressor, this task has been shown to induce emotional distress in the form of anxiety, anger, frustration, and irritability among clinical and nonclinical samples (Bornovalova et al., 2008; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2010; Lejuez et al., 2003). To ensure that the task induced emotional distress in this sample, participants completed the negative affect (NA) scale of the Positive and Negative Affect Schedule (PANAS-NA; Watson, Clark, & Tellegen, 1988) before the PASAT-C and following completion of the third (most difficult) level of the task.

### S-DERS Validation

To provide evidence for the construct validity of the S-DERS, participants completed a series of trait-based self-report measures of emotion dysregulation and related constructs, including emotional functioning, mindfulness, and experiential avoidance. Additionally, given the relevance of emotion regulation difficulties to substance use (e.g., Fox et al., 2007; Fox & Sinha, 2008), participants completed measures of past-year alcohol and drug use problems. Moreover, the convergent validity of this measure with regard to laboratory-based assessments of emotional reactivity was also examined. Finally, the predictive validity of the S-DERS with regard to emotional reactivity to a trauma-related cue was examined.

**Trait measures of emotion regulation and related constructs—**The original Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item measure that assesses participants' typical levels of emotion dysregulation across the six dimensions noted previously. The DERS demonstrates good test-retest reliability and construct and predictive validity and is significantly associated with objective measures of emotion regulation (Gratz & Roemer, 2004; Gratz & Tull, 2010). Internal consistency in the current sample was good for the overall scale ( $\alpha=0.95$ ) and subscales ( $\alpha_s=0.84-0.93$ ). Given the likelihood that state emotion regulation difficulties are associated with trait emotion regulation difficulties, S-DERS scores were expected to positively correlate with the original DERS total and subscale scores. In particular, those S-DERS scales that most closely correspond to the original DERS subscales were expected to display the highest correlations.

The Emotion Amplification and Reduction Scales (TEARS; Hamilton et al., 2007) is an 18-item measure that assesses an individual's ability to modify the trajectory of an emotional response or expression. The measure contains two subscales: emotion reduction and emotion

amplification. Evidence supports the reliability and construct validity of the measure (Hamilton et al., 2007). In the current study, only the 9-item emotion reduction subscale ( $\alpha=0.90$ ) was used. This scale was expected to be inversely related to S-DERS scores, particularly the total S-DERS scale and the two S-DERS subscales reflecting difficulties with emotional and behavioral responses to emotional states.

The Affect Intensity Measure (AIM; Larsen & Diener, 1987) is a 40-item measure of trait emotional intensity and reactivity, with higher scores indicating greater emotional intensity/reactivity. Research supports the reliability and validity of the AIM (Larsen & Diener, 1987; Larsen et al., 1986). Given both (a) evidence that the AIM is multidimensional (measuring both positive and negative emotional intensity and reactivity; Weinfurt et al., 1994; Williams, 1989), and (b) the emphasis on negative emotions within the conceptualization of emotion regulation difficulties used here, this study examined only the negative emotional intensity/reactivity subscale (16 items;  $\alpha=0.80$ ). Scores on the S-DERS were expected to be positively correlated with this subscale. In particular, given that emotional intensity/reactivity has been theorized to interfere with adaptive emotion regulation (Flett, Blankstein, & Obertynski, 1996; Linehan, 1993), negative emotional intensity/reactivity on the AIM was expected to demonstrate the strongest associations with the total S-DERS score and the two S-DERS subscales reflecting difficulties with emotional and behavioral responses to emotional states.

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is a 39-item measure that assesses five dispositional facets of mindfulness, including: nonreactivity to inner experience, nonjudgment of inner experience, acting with awareness, describing, and observing. Higher scores reflect greater levels of dispositional mindfulness. FFMQ subscale scores have been found to have good psychometric properties across multiple samples (Baer et al., 2006; 2008). In the current study, only the awareness and describe scales were administered, and a composite awareness/describe scale ( $\alpha=0.90$ ) was created by summing the two subscales. This composite FFMQ scale was expected to correlate negatively with S-DERS total and subscale scores, particularly those subscales reflecting difficulties with emotional awareness and clarity.

The Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) is a 9-item measure of experiential avoidance (i.e., the tendency to avoid unwanted internal experiences, particularly emotions). Higher scores reflect greater levels of experiential avoidance. The AAQ demonstrates adequate convergent and concurrent validity (Hayes et al., 2004) and is significantly associated with a behavioral measure of willingness to tolerate distress (Gratz et al., 2006). Higher scores indicate greater experiential avoidance ( $\alpha=0.67$  in this sample). The AAQ was expected to correlate positively with the S-DERS scales, particularly the total scale and the subscale reflecting negative secondary emotional reactions to emotional states.

**Measures of substance use problems—**The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993) is a 10-item measure that assesses alcohol misuse and alcohol-related problems. Items are summed to provide an overall score of alcohol problem severity. This measure has demonstrated good reliability and validity (Reinert & Allen, 2001), and internal consistency in the current

sample was good ( $\alpha=0.83$ ). The Drug Use Questionnaire (DUQ; Hien & First, 1991) is an 18-item measure that assesses both the frequency of drug use and drug use problems (i.e., DSM-IV substance dependence criteria) over the past year. The DUQ demonstrates good convergent validity with structured interview diagnoses in associations with relevant clinical outcomes (Lejuez, Bornoalova, Reynolds, Daughters, & Curtin, 2007). In this study, only the scale assessing drug use problems ( $\alpha=0.82$ ) was used, given the relevance of emotion dysregulation to substance use problems (vs. substance use; e.g., Baker et al. 2004; Sher & Grekin, 2007; Simons & Carey, 2006). Both the AUDIT and DUQ problems scale were expected to correlate positively with the S-DERS scales, particularly the subscale reflecting difficulties managing behaviors in response to emotional states.

**Laboratory assessment of state emotional reactivity**—To assess emotional reactivity in the laboratory, participants completed the PANAS-NA (Watson et al., 1988) before and after three separate emotion-eliciting laboratory tasks. Specifically, participants rated the extent to which they were currently experiencing 10 forms of NA (e.g., distressed, upset) on a scale from 1 (very slightly or not at all) to 5 (extremely). Emotional reactivity to the three laboratory tasks (described below) was calculated as the change in NA from pre- to post-task.

The first two tasks assessed negative affect reactivity in response to emotion-eliciting film clips. Specifically, and consistent with past research examining emotional responding in the laboratory (e.g., Ehring, Tuschen-Caffier, Schnulle Fischer, & Gross, 2010; Kuo & Linehan, 2009), participants viewed three brief (4-5 min) film clips that have been shown in previous research to elicit amusement (“The Money Pit”), sadness (“The Champ”), and fear (“Silence of the Lambs”), respectively (Gross & Levenson, 1995; Orsillo, Batten, Plumb, Luterek, & Roessner, 2004). The PANAS-NA was administered immediately before and after each film clip. Given our interest in the regulation of negative emotions in particular, only reactivity to the sadness- and fear-eliciting clips was examined here. The final task was used to assess reactivity to a sexual assault-related cue. Specifically, the PANAS-NA was administered immediately before and after the Risk Perception Survey (RPS; Messman-Moore & Brown, 2006), a computer-administered vignette depicting a sexual assault. In this task, participants are asked to imagine themselves in the situation and think about how they would respond. For the purposes of this study, only emotional reactivity to this task was examined. Importantly, the RPS was administered immediately after participants completed the S-DERS, thereby providing an index of the predictive validity of the measure. S-DERS scores were expected to be positively correlated with all three negative emotional reactivity variables.

## Procedure

All methods received approval by the Institutional Review Boards of all participating institutions. After providing written informed consent, participants completed a diagnostic interview and a series of self-report questionnaires. All questionnaires were administered online and completed on a computer in the laboratory of one of the study sites. Next, participants completed the laboratory portion of the study. Following a 5 min baseline period, participants viewed the three film clips, the order of which was counterbalanced and



randomized across participants. Participants were instructed to pay close attention to the images presented on the screen and what the people in the video said and did. They were also instructed to pay attention to how they felt during the video. Following each film clip, participants completed word puzzles for 5 min to allow time to return to baseline emotional arousal.

Following completion of the film clips, participants were instructed to sit quietly for another 5 min baseline period, and then received standardized instructions for completing the PASAT-C. Once participants confirmed that they understood the instructions, the PASAT-C began, following which participants immediately completed the S-DERS. After another 5 min baseline period, participants completed the RPS. Participants were reimbursed \$75 for this four hour session.

## Results

### Manipulation Check for Laboratory Tasks

Providing support for the use of the PASAT-C as a laboratory stressor, results of a paired-samples *t*-test examining changes in NA from pre- to post-PASAT-C revealed a significant increase in NA in response to the PASAT-C (T1:  $M=13.6\pm 4.2$ ; T2:  $M=20.2\pm 7.4$ ;  $t_{(482)}=-24.4$ ,  $p<.001$ ). Likewise, providing support for the use of the film clips as emotion-eliciting tasks, paired-samples *t*-tests revealed significant increases in NA in response to the sadness clip (T1:  $M=12.4\pm 3.5$ ; T2:  $M=14.5\pm 5.1$ ;  $t_{(474)}=-11.6$ ,  $p<.001$ ) and the fear clip (T1:  $M=12.4\pm 3.4$ ; T2:  $M=15.4\pm 5.8$ ;  $t_{(477)}=-12.9$ ,  $p<.001$ ).

### Factor Structure of the S-DERS

An exploratory factor analysis (EFA) with principal axis factoring extraction method and promax oblique rotation (nonorthogonal, allowing factors to be correlated consistent with the expected associations among the various emotion dysregulation dimensions) was conducted on the initial pool of 28 S-DERS items. Several criteria were used to select the number of factors to retain in the final solution. Examination of both the scree plot and eigenvalues supported a four-factor solution (eigenvalue range: 1.2 to 9.5; see Table 1). However, given noted limitations of relying exclusively on these methods when determining the number of factors to retain (see O'Connor, 2000), parallel analysis was performed to provide an additional criterion for selecting the final number of factors. Specifically, parallel analysis was conducted according to procedures outlined by O'Connor (2000), in which comparisons are made between eigenvalues of the actual data and permutations of eigenvalues of random data. The parallel analysis was conducted using principal axis factoring with 99% confidence intervals and 1000 random generated data sets. Results of this analysis supported a five-factor solution (see Table 1 and online supplement Table S2). Thus, both the four-factor and five-factor solutions were further evaluated.

Based on both theoretical and statistical considerations, the four-factor solution was selected as the final model. Specifically, this decision was based on the following criteria: (a) the comparative consistency of item content across factors in each solution, (b) the fact that the five-factor solution contained two factors with only two items, suggesting possible over-

extraction, (c) evidence suggesting that the parallel analysis approach used here may have a tendency to overestimate the number of appropriate factors (Buja & Eyuboglu, 1992), and (d) the greater theoretical consistency and interpretability of the four-factor versus five-factor solution (vis-à-vis the multidimensional conceptualization of emotion dysregulation on which the DERS is based).

Assignment of items to each of the four factors was based on factor loadings of  $\geq 0.40$ . Additionally, given that a number of items exhibited cross-loadings of nearly 0.40, items with cross-loadings of  $\geq 0.30$  were excluded. Based on this approach, seven items were excluded, including four that cross-loaded (item 2 [“I am having difficulty focusing on anything other than my emotions”], item 5 [“I believe that wallowing in my feelings is all I can do”], item 9 [“I feel like I can remain in control of my behaviors”], and item 25 [“I know exactly how I am feeling”]), and three that did not load on any factor (item 6 [“I am having difficulty making sense out of my feelings”], item 13 [“I believe that there is nothing I can do to make myself feel better”], item 20 [“My feelings are not stopping me from getting things done”]). All remaining items exhibited factor loadings of  $\geq 0.40$ . After excluding these seven items, a final EFA was conducted on the remaining 21 items to ensure that the factor loadings remained  $\geq 0.40$  and that no items exhibited cross-loading based on factor loadings of  $\geq 0.30$  (see Tables 1 and 2). Upon extraction in the final EFA, the four factors accounted for 62.3% of the total variance (see Table 1).

The four factors of the S-DERS are interpretable and generally consistent with the multidimensional conceptualization of emotion dysregulation on which the DERS is based. Factor 1 includes items that reflect negative responses to and perceptions of one’s current emotional state, and was labeled Nonacceptance of Current Emotions (Nonacceptance). This factor overlaps conceptually with the similar Nonacceptance subscale of the original DERS. Factor 2 includes items reflecting difficulties with emotional and behavioral responding in the moment, and was labeled Limited Ability to Modulate Current Emotional and Behavioral Responses (Modulate). This factor overlaps conceptually with the Strategies, Impulse, and Goals subscales of the original trait DERS, combining difficulties modulating both emotions and behavioral responses to emotions into a single state scale. Factor 3 is composed of items reflecting limited attention to and awareness of current emotional states, and was labeled Lack of Awareness of Current Emotions (Awareness). This factor overlaps conceptually with the similar Awareness subscale of the original DERS. Factor 4 is composed of items reflecting problems with identifying emotional states, and was labeled Lack of Clarity about Current Emotions (Clarity). This factor overlaps conceptually with the similar Clarity subscale of the original DERS. Items included in the final 21-item S-DERS are listed by factor in Table 2. The final version of this measure can be found in the online supplementary material.

Scores for the S-DERS subscales were calculated by summing individual items for each subscale, and the S-DERS total score was calculated by summing all 21 items. Items on the Awareness subscale, which were worded opposite in direction from items on other the other subscales, were reverse scored prior to calculating the sums. As expected, several of the subscales were significantly intercorrelated: Nonacceptance and Modulate,  $r=0.72$ ,  $p < .001$ ; Nonacceptance and Clarity,  $r=0.43$ ,  $p < .001$ ; Modulate and Clarity,  $r=0.49$ ,  $p < .001$ ;

Awareness and Clarity,  $r=0.13$ ,  $p < .01$ . However, the Awareness subscale was not significantly associated with the Nonacceptance or Modulate subscales ( $ps > .05$ ). Means and standard deviations for the total and subscale scores are presented in Table 3.

### Internal Consistency of the S-DERS

Cronbach's alphas were calculated to determine the internal consistency of the full scale, as well as the four subscales. The total scale ( $\alpha=0.86$ ) demonstrated good internal consistency, and the Nonacceptance ( $\alpha=0.92$ ), Modulate ( $\alpha=0.85$ ), and Awareness ( $\alpha=0.79$ ) subscales demonstrated adequate to excellent internal consistency. The Clarity ( $\alpha=0.65$ ) subscale demonstrated marginal internal consistency, although a lower value such as this is not unusual for a factor with a smaller number of items. Examination of the inter-item correlation to provide a secondary indication of the homogeneity of the scale (Briggs & Cheek, 1986) revealed a moderate association between the items ( $r=0.48$ ,  $p < .001$ ), suggesting satisfactory consistency for the two-item Clarity scale.

### Validity of the S-DERS

Correlations between the S-DERS total and subscale scores and the other measures of interest are presented in Table 3. Given the number of comparisons made, only  $p$ -values of less than .01 were interpreted as significant. As anticipated, the S-DERS total and subscale scores were significantly positively associated with the original DERS total score, and most of the correlations between the S-DERS total and subscales and the original DERS subscales were also significant. Of note, and as expected, the associations between the S-DERS subscales and the corresponding original DERS subscales evidenced the highest correlations. Nonetheless, findings that the correlations between the S-DERS subscales and the corresponding original DERS subscales were only moderate in size provide evidence for the S-DERS being distinct from the original trait-oriented DERS. These findings are also consistent with previous studies that have found moderate correlations between state-based and trait-based measures of the same construct (e.g., impulsivity; Tomko et al., 2014).

The majority of the correlations between the S-DERS total and subscales and the other trait measures of emotion regulation and related constructs were also significant and in the anticipated direction (see Table 3). In particular, and consistent with hypotheses, both the AIM negative emotional intensity/reactivity scale and the TEARS reduction scale demonstrated the largest correlations with the S-DERS total scale and Modulate and Nonacceptance subscales. With regard to experiential avoidance, the S-DERS total and subscales (particularly Nonacceptance and Modulate, as expected) were positively associated with the AAQ. Further, the FFMQ Awareness/Describe composite scale was negatively associated with the S-DERS total and subscale scores, including the Clarity and Awareness subscales (although its association with the Awareness subscale was not as strong as anticipated). Finally, several correlations between the S-DERS total and subscale scores and the measures of substance use problems were also significant, with the S-DERS Modulate scale showing the highest correlations with these measures as predicted.

With regard to the laboratory-based assessments of state emotional reactivity, results supported an association between the S-DERS and emotional reactivity to each of the

laboratory tasks (see Table 3). Specifically, the S-DERS Nonacceptance, Modulate, and total scores were positively associated with emotional reactivity to both the fear and sadness film clips (with the Nonacceptance scale demonstrating the largest correlations in both cases). Moreover, with one exception, all of these correlations remained significant when controlling for the corresponding original DERS scale with partial correlations<sup>1</sup> (Table 3). Findings that the S-DERS scales remain significantly associated with state emotional reactivity when accounting for the corresponding trait-oriented DERS subscales provide further support for the utility and distinctiveness of the S-DERS (relative to the original DERS).

Finally, providing support for the predictive validity of the S-DERS, the S-DERS Modulate, Awareness, Clarity, and total scores predicted emotional reactivity to the trauma-specific RPS task, with the total score and Modulate scale demonstrating the highest correlations (Table 3). Moreover, both the S-DERS total and Modulate scores remained significantly associated with emotional reactivity to this task when controlling for the corresponding DERS scales (see Table 3). These results provide further support for the predictive validity of the S-DERS above and beyond the trait-oriented DERS.

## Discussion

The purpose of this study was to develop and validate a state-based measure of emotion regulation difficulties, the S-DERS. Although there are many existing measures of emotion dysregulation and related constructs, most of these were designed to assess dispositional tendencies. Although useful, a limitation of such measures is that they were not developed or validated for use in momentary assessments of a given construct. Thus, such trait-based measures cannot be readily utilized in study designs incorporating methods that are increasingly common in psychopathology research, including laboratory-based experimental paradigms and naturalistic-based study protocols (e.g., ecological momentary assessment or daily diary studies).

The current results provide preliminary support for the reliability and validity of the S-DERS as a state measure of several dimensions of emotion regulation difficulties. Specifically, results suggested four distinct, albeit interrelated, dimensions of emotion dysregulation in the moment: (a) nonacceptance of current emotions, (b) current difficulties with the modulation of emotional and behavioral responses, (c) lack of awareness of current emotions, and (d) lack of clarity about current emotions. Importantly, although these factors were significantly associated with the corresponding factors on the original DERS, these correlations were only moderate, suggesting that the S-DERS is distinct from the DERS in assessing state versus trait emotion regulation difficulties. This is consistent with evidence and theories suggesting that both psychological and interpersonal factors may impact one's ability to successfully regulate emotional states (e.g., Campos et al., 2011; Flett et al., 1996; Linehan, 1993).

---

<sup>1</sup>Because the S-DERS Modulate subscale is comprised of modified items from the Strategies, Impulse, and Goals subscales of the original trait DERS (vs. one single DERS subscale), a composite scale capturing all three of these subscales was formed by summing the original DERS Impulse, Goals, and Strategies subscales. This composite scale was then used in the partial correlations involving the S-DERS Modulate scale.

As anticipated, the S-DERS was significantly positively associated with a number of trait measures of emotion dysregulation and related constructs, including negative emotional intensity/reactivity and experiential avoidance, and significantly negatively associated with mindfulness and the ability to modulate negative emotional states. Additionally, the S-DERS was positively associated with both substance use problems and laboratory measures of state emotional reactivity. Evidence was also provided for the predictive validity of this measure, as indicated by positive associations between emotional reactivity to a trauma-related cue and the S-DERS total score and three of four subscales. Of particular relevance, the majority of the significant correlations between the S-DERS scales and state emotional reactivity remained significant even when controlling for the corresponding original trait DERS scales. In addition to providing further support for the construct and predictive validity of the S-DERS, these findings highlight the utility of this state-based measure for understanding momentary emotional responses (relative to trait-based measures of emotion dysregulation), as well as the uniqueness and added value of the S-DERS in relation to the original DERS. Finally, the discriminant validity of the four subscales was supported, as evidenced by: (a) the particularly strong associations between the behaviorally-oriented Modulate subscale and measures of substance use problems, (b) the particularly strong associations between the AIM negative emotional intensity/reactivity scale and the Nonacceptance and Modulate subscales, and (c) findings that the Clarity subscale demonstrated the strongest association of all four subscales with the theoretically related mindfulness measure.

There were several strengths of the current study, including the use of a large, representative community sample. Further, the use of a multi-method validation approach that included both self-report and laboratory-based assessments is a particular strength. Although these results provide preliminary support for the psychometric properties of the S-DERS, however, there are also several limitations of the research that should be noted. First, because the sample was comprised entirely of women, it is unclear whether the findings would generalize to men. Future research will be needed to validate the factor structure and psychometrics of the S-DERS among males. Second, one of the S-DERS subscales (Clarity) was comprised of only two items, which may account for the lower reliability of this subscale compared to the others. Given that two-item scales may be weaker and less stable (Costello & Osborne, 2005), findings pertaining to the Clarity subscale should be interpreted with caution. Third, although this study examined forms of reliability (i.e., internal consistency) and validity (i.e., construct validity) of the S-DERS, future research will be needed to replicate and more comprehensively evaluate the psychometric properties of the measure. In particular, further research is needed to examine the discriminant validity of the S-DERS scales relative to each other and to the original DERS scales. Relatedly, the S-DERS was administered only once in the current study, thus additional research will be needed to better establish the sensitivity of the measure to fluctuations in emotion dysregulation over time. Likewise, although the laboratory stressor used in this study is an empirically-supported task shown to induce emotional distress in the form of anxiety and anger-spectrum emotions, the specific forms of emotion regulation difficulties experienced in response to distressing stimuli may vary based upon the nature of those stimuli (e.g., those of an interpersonal versus intrapersonal nature). As such, future research examining the factor structure and psychometric properties of the S-DERS in response to a variety of

naturalistic and/or laboratory-based stressors is needed. Finally, although the use of a diverse community sample is an asset of this study, it is unclear to what extent results of this study are applicable to clinical populations. Given that levels of emotion regulation difficulties are likely higher among clinical versus community populations, our use of a community sample may have reduced the range of emotion regulation difficulties present in this sample and contributed to the relatively low mean scores found on the S-DERS subscale and total scores. As such, examination of the psychometric properties of the S-DERS in relevant clinical populations that are characterized by higher levels of emotion dysregulation (e.g., those with eating disorders, substance use disorders, mood or anxiety disorders, or borderline personality disorder) would be a useful direction for future research.

In sum, the current study provided initial evidence supporting the psychometric properties of a new state-based measure of emotion regulation difficulties that is based on a multidimensional conceptualization of emotion dysregulation. The S-DERS provides a total score and four subscale scores: nonacceptance, modulate, awareness, and clarity. The measure was found to be reliable and valid, with the construct validity supported by associations with conceptually relevant constructs assessed via both self-report and laboratory-based measures. The S-DERS may have utility in research examining dimensions of emotion dysregulation, particularly when theoretical models or study designs necessitate repeated assessments over short intervals. Additionally, data gathered using the S-DERS has potential clinical utility. For instance, the S-DERS could be administered in conjunction with in vivo exposure exercises or other clinical interventions to monitor progress with regard to emotion regulation difficulties across the course of a given treatment. Information regarding the specific difficulties that a patient experiences in response to particular types of cues or stressors could also be used to enhance the targeted and tailored nature of psychotherapeutic interventions.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

This research was supported by National Institute of Child Health and Human Development Grant R01 HD062226, awarded to the third author (DD), and National Institute of Mental Health Grant K23 MH101342, awarded to the first author (JML). The authors would like to thank Dr. Ross D. Crosby for his helpful comments on an earlier version of this manuscript.

## References

- Armey MF, Crowther JH, Miller IW. Changes in ecological momentary assessment reported affect associated with episodes of nonsuicidal self-injury. *Behavior Therapy*. 2011; 42:579–588. [PubMed: 22035987]
- Baer RA, Smith GT, Hopkins J, Krietemeyer J, Toney L. Using self-report assessment methods to explore facets of mindfulness. *Assessment*. 2006; 13:27–45. [PubMed: 16443717]
- Baer RA, Smith GT, Lykins E, Button D, Krietemeyer J, Sauer S, et al. Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment*. 2008; 15:329–342. [PubMed: 18310597]

- Baker TB, Piper ME, McCarthy DE, Majeskie MR, Fiore MC. Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*. 2004; 111:33–51. [PubMed: 14756584]
- Boden, MT., Kulkarni, M., Shurick, A., Bonn-Miller, M., Gross, J. Responding to trauma and loss: An emotion regulation perspective. In: Kent, M.Davis, MC., Reich, JW., editors. *The Resilience Handbook: Approaches to Stress and Trauma*. Routledge; New York, NY: 2014. p. 86-99.
- Bornoalova MA, Gratz KL, Daughters SB, Nick B, Delany-Brumsey A, Lynch TW, Lejuez CW. A multimodal assessment of the relationship between emotion dysregulation and borderline personality disorder among inner-city substance users in residential treatment. *Journal of Psychiatric Research*. 2008; 42:717–726. [PubMed: 17868698]
- Brans K, Koval P, Verduyn P, Lim YL, Kuppens P. The regulation of negative and positive affect in daily life. *Emotion*. 2013; 13:926–939. [PubMed: 23731436]
- Briggs SR, Cheek JM. The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality*. 1986; 54:106–148.
- Buja A, Eyuboglu N. Remarks on parallel analysis. *Multivariate Behavioral Research*. 1992; 27:509–540. [PubMed: 26811132]
- Campos JJ, Walle EA, Dahl A, Main A. Reconceptualizing emotion regulation. *Emotion Review*. 2011; 3:26–35.
- Costello AB, Osborne JW. Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation*. 2005; 10(7)
- de Veld DM, Riksen-Walraven JM, de Weerth C. The relation between emotion regulation strategies and physiological stress responses in middle childhood. *Psychoneuroendocrinology*. 2012; 37:1309–1319. [PubMed: 22309825]
- Egloff B, Schmukle SC, Burns LR, Schwerdtfeger A. Spontaneous emotion regulation during evaluated speaking tasks: associations with negative affect, anxiety expression, memory, and physiological responding. *Emotion*. 2006; 6:356–366. [PubMed: 16938078]
- Farmer AS, Kashdan TB. Social anxiety and emotion regulation in daily life: spillover effects on positive and negative social events. *Cognitive Behaviour Therapy*. 2012; 41:152–162. [PubMed: 22428662]
- Fleeson W. Situation-based contingencies underlying trait-content manifestation in behavior. *Journal of Personality*. 2007; 75:825–862. [PubMed: 17576360]
- Flett GL, Blankstein KR, Obertynski M. Affect intensity, coping styles, mood regulation expectancies, and depressive symptoms. *Personality and Individual Differences*. 1996; 20:221–228.
- Fox H, Axelrod S, Paliwal P, Sleeper J, Sinha R. Difficulties in emotion regulation and impulse control during cocaine abstinence. *Drug and Alcohol Dependence*. 2007; 89:298–301. [PubMed: 17276626]
- Fox H, Hong K, Sinha R. Difficulties in emotion regulation and impulse control in recently abstinent alcoholics compared with social drinkers. *Addictive Behaviors*. 2008; 33:388–394. [PubMed: 18023295]
- Gratz KL. Targeting emotion dysregulation in the treatment of self-injury. *Journal of Clinical Psychology*. 2007; 63:1091–1103. [PubMed: 17932982]
- Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*. 2004; 26:41–54.
- Gratz KL, Rosenthal M, Tull MT, Lejuez CW, Gunderson JG. An experimental investigation of emotion dysregulation in borderline personality disorder. *Journal of Abnormal Psychology*. 2006; 115:850–855. [PubMed: 17100543]
- Gratz, KL., Tull, MT. Emotion regulation as a mechanism of change in acceptance-and mindfulness-based treatments. In: Baer, RA., editor. *Assessing mindfulness and acceptance: Illuminating the processes of change*. New Harbinger Publications; Oakland, CA: 2010. p. 107-134.
- Gratz KL, Weiss NH, Tull MT. Examining emotion regulation as an outcome, mechanism, or target of psychological treatments. *Current Opinion in Psychology*. 2015; 3:85–90. [PubMed: 25859561]
- Gross JJ, Feldman Barrett L. Emotion generation and emotion regulation: One or two depends on your point of view. *Emotion Review*. 2011; 3:8–16. [PubMed: 21479078]

- Gross JJ, John OP. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*. 2003; 85:348–362. [PubMed: 12916575]
- Gross JJ, Levenson RW. Emotion elicitation using films. *Cognition and Emotion*. 1995; 9:87–108.
- Gross, JJ., Thompson, RA. *Handbook of emotion regulation*. Guilford Press; New York, NY: 2007. Emotion regulation: Conceptual foundations; p. 3-24.
- Gyurak A, Gross JJ, Etkin A. Explicit and implicit emotion regulation: A dual-process framework. *Cognition & Emotion*. 2011; 25:400–412. [PubMed: 21432682]
- Hamilton NA, Karoly P, Gallagher M, Steven N, Karlson C, McCurdy D. The assessment of emotion regulation in cognitive context: The Emotion Amplification and Reduction Scales. *Cognitive Therapy and Research*. 2009; 33:225–263.
- Hayes SC, Strosahl KD, Wilson KG, Bissett RT, Pistorello J, Toarmino D, McCurry SM. Measuring experiential avoidance: A preliminary test of a working model. *The Psychological Record*. 2004; 54:553–578.
- Haynos AF, Fruzzetti AE. Anorexia nervosa as a disorder of emotion dysregulation: Evidence and treatment implications. *Clinical Psychology: Science and Practice*. 2011; 18:183–202.
- Hien, DA., First, M. Unpublished scale, Columbia College of Physicians and Surgeons. New York State Psychiatric Institute; New York, New York: 1991. Drug use questionnaire.
- Hofmann SG, Sawyer AT, Fang A, Asnaani A. Emotion dysregulation model of mood and anxiety disorders. *Depression and Anxiety*. 2012; 29:409–416. [PubMed: 22430982]
- Kappas A. Emotion and regulation are one! *Emotion Review*. 2011; 3:17–25.
- Larsen RJ, Diener E. Affect intensity as an individual difference characteristic: A review. *Journal of Research in Personality*. 1987; 21:1–39.
- Larsen RJ, Diener E, Emmons RA. Affect intensity and reactions to daily life events. *Journal of Personality and Social Psychology*. 1986; 51:803–814.
- Lavender JM, Wonderlich SA, Peterson CB, Crosby RD, Engel SG, Mitchell JE, Berg K. Dimensions of emotion dysregulation in bulimia nervosa. *European Eating Disorders Review*. 2014; 22:212–216. [PubMed: 24619484]
- Lejuez CW, Bornoalova MA, Reynolds ER, Daughters SB, Curtin JJ. Risk factors in the relationship between gender and crack/cocaine. *Experimental and Clinical Psychopharmacology*. 2007; 15:165–175. [PubMed: 17469940]
- Lejuez CW, Kahler CW, Brown RA. A modified computer version of the paced auditory serial addition task (PASAT) as a laboratory-based stressor. *Behavior Therapist*. 2003; 26:290–293.
- Linehan, MM. *Cognitive behavioral treatment of borderline personality disorder*. Guilford Press; New York, NY: 1993.
- Mennin DS, Heimberg RG, Turk CL, Fresco DM. Applying an emotion regulation framework to integrative approaches to generalized anxiety disorder. *Clinical Psychology: Science and Practice*. 2002; 9:85–90.
- Mennin DS, McLaughlin KA, Flanagan TJ. Emotion regulation deficits in generalized anxiety disorder, social anxiety disorder, and their co-occurrence. *Journal of Anxiety Disorders*. 2009; 23:866–871. [PubMed: 19464142]
- Messman-Moore TL, Brown AL. Risk perception, rape, and sexual revictimization: A prospective study of college women. *Psychology of Women Quarterly*. 2006; 30:159–172.
- O'Connor BP. SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instrumentation, and Computers*. 2000; 32:396–402.
- Orsillo SM, Batten SV, Plumb JC, Luterek JA, Roessner BM. An experimental study of emotional responding in women with posttraumatic stress disorder related to interpersonal violence. *Journal of Traumatic Stress*. 2004; 17:241–248. [PubMed: 15253096]
- O'Toole MS, Jensen MB, Fentz HN, Zachariae R, Hougaard E. Emotion differentiation and emotion regulation in high and low socially anxious individuals: An experience-sampling study. *Cognitive Therapy and Research*. 2014; 38:428–438.



- Racine SE, Wildes JE. Emotion dysregulation and symptoms of anorexia nervosa: The unique roles of lack of emotional awareness and impulse control difficulties when upset. *International Journal of Eating Disorders*. 2013; 46:713–720. [PubMed: 23754665]
- Reinert DF, Allen JP. The Alcohol Use Disorders Identification Test (AUDIT): A review of recent research. *Alcoholism: Clinical and Experimental Research*. 2002; 26:272–279.
- Roemer L, Lee JK, Salters-Pedneault K, Erisman SM, Orsillo SM, Mennin DS. Mindfulness and emotion regulation difficulties in generalized anxiety disorder: Preliminary evidence for independent and overlapping contributions. *Behavior Therapy*. 2009; 40:142–154. [PubMed: 19433145]
- Saunders JB, Aasland OG, Babor TF, De La Fuente JR, Grant M. Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption: II. *Addiction*. 1993; 88:791–804. [PubMed: 8329970]
- Shahar B, Herr NR. Depressive symptoms predict inflexibly high levels of experiential avoidance in response to daily negative affect: a daily diary study. *Behaviour Research and Therapy*. 2011; 49:676–681. [PubMed: 21820646]
- Sher, KJ., Grekin, ER. Alcohol and affect regulation. In: Gross, JJ., editor. *Handbook of emotion regulation*. 2007. p. 560-580.
- Shiffman S, Stone AA, Hufford MR. Ecological momentary assessment. *Annual Review of Clinical Psychology*. 2008; 4:1–32.
- Shiffman S, Waters AJ. Negative affect and smoking lapses: A prospective analysis. *Journal of Consulting and Clinical Psychology*. 2004; 72:192–201. [PubMed: 15065954]
- Simons JS, Carey KB. An affective and cognitive model of marijuana and alcohol problems. *Addictive Behaviors*. 2006; 31:1578–1592. [PubMed: 16426771]
- Simons JS, Gaher RM. The Distress Tolerance Scale: Development and validation of a self-report measure. *Motivation and Emotion*. 2005; 29:83–102.
- Tan PZ, Forbes EE, Dahl RE, Ryan ND, Siegle GJ, Ladouceur CD, Silk JS. Emotional reactivity and regulation in anxious and nonanxious youth: a cell-phone ecological momentary assessment study. *Journal of Child Psychology and Psychiatry*. 2012; 53:197–206. [PubMed: 22176136]
- Thompson RA. Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development*. 1994; 59:25–52. [PubMed: 7984164]
- Tomko RL, Solhan MB, Carpenter RW, Brown WC, Jahng S, Wood PK, Trull TJ. Measuring impulsivity in daily life: the momentary impulsivity scale. *Psychological Assessment*. 2014; 26:339–349. [PubMed: 24274047]
- Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*. 1988; 54:1063–1070. [PubMed: 3397865]
- Weinfurt KP, Bryant FB, Yarnold PR. The factor structure of the Affect Intensity Measure: In search of a measurement model. *Journal of Research in Personality*. 1994; 28:314–331.
- Whiteside SP, Lynam DR. The Five-Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*. 2001; 30:669–689.
- Williams DG. Neuroticism and extraversion in different factors of the Affect Intensity Measure. *Personality and Individual Differences*. 1989; 10:1095–1100.

**Table 1**

Eigenvalues for Initial EFA, Parallel Analysis, and Final EFA

Factor	Eigenvalues for Initial EFA		Eigenvalues for Parallel Analysis		Eigenvalues for Final EFA	
	Total	% Variance	Raw Data	99 <sup>th</sup> Percentile	Total	% Variance
1	9.51	33.97	9.07	0.64	7.78	37.06
2	3.61	12.89	3.03	0.54	2.85	13.58
3	1.45	5.16	1.00	0.48	1.43	6.79
4	1.22	4.37	0.67	0.43	1.02	4.87
5	0.97	3.45	0.42	0.38	0.88	4.17
6	0.92	3.27	0.33	0.34	0.73	3.48
7	0.87	3.10	0.30	0.30	0.68	3.23
8	0.82	2.93	0.25	0.27	0.61	2.92
9	0.74	2.64	0.21	0.23	0.55	2.64
10	0.68	2.45	0.13	0.20	0.54	2.55

*Note.* Parallel analysis was conducted with principal axis factoring.

**Table 2**

Factor Structure, Intercorrelations, Pattern Coefficients, Structure Coefficients, and Items of the Final 21-Item S-DERS

Item	Factor			
	1	2	3	4
<b>Factor 1: Nonacceptance of Current Emotions (NONACCEPTANCE)</b>				
12. I feel ashamed with myself for feeling this way.	<b>.92 (.86)</b>	-.14 (.55)	.04 (.10)	.07 (.42)
7. I am embarrassed for feeling this way.	<b>.89 (.88)</b>	.00 (.62)	-.05 (.03)	-.02 (.42)
1. I feel guilty for feeling this way.	<b>.80 (.69)</b>	-.15 (.41)	.05 (.12)	-.01 (.28)
8. I am feeling very bad about myself.	<b>.77 (.81)</b>	.19 (.62)	-.06 (.05)	-.19 (.30)
17. I am angry with myself for feeling this way.	<b>.68 (.79)</b>	.19 (.64)	-.01 (.08)	-.06 (.37)
27. I feel like I'm a weak person for feeling this way.	<b>.61 (.75)</b>	.13 (.62)	-.05 (-.01)	.12 (.49)
24. I am irritated with myself for feeling this way.	<b>.56 (.71)</b>	.10 (.59)	.03 (.06)	.18 (.50)
<b>Factor 2: Limited Ability to Modulate Current Emotional and Behavioral Responses (MODULATE)</b>				
18. I am having difficulty controlling my behaviors.	-.18 (.42)	<b>.84 (.72)</b>	-.02 (-.00)	.02 (.41)
23. My emotions feel out of control.	-.07 (.52)	<b>.75 (.77)</b>	.02 (.03)	.11 (.50)
15. I believe that I will continue feeling this way for a long time.	.09 (.52)	<b>.67 (.68)</b>	.04 (.09)	-.09 (.32)
4. I feel out of control.	.12 (.52)	<b>.58 (.65)</b>	.03 (.07)	-.04 (.34)
21. I believe that I am going to end up feeling very depressed.	.16 (.55)	<b>.57 (.67)</b>	-.02 (.02)	-.02 (.38)
28. My emotions feel overwhelming.	.28 (.65)	<b>.50 (.71)</b>	.02 (.06)	.03 (.44)
14. I am having difficulty doing the things I need to do right now.	.10 (.48)	<b>.47 (.60)</b>	-.03 (-.02)	.12 (.44)
<b>Factor 3: Lack of Awareness of Current Emotions (AWARENESS)</b>				
10. I am acknowledging my emotions. (r)	.09 (.12)	-.05 (.04)	<b>.71 (.72)</b>	-.01 (-.13)
16. I care about what I am feeling. (r)	.02 (.10)	.08 (.07)	<b>.70 (.72)</b>	-.09 (-.17)
3. I am paying attention to how I feel. (r)	.11 (.19)	-.00 (.12)	<b>.69 (.70)</b>	.02 (-.05)
26. I believe that my feelings are valid and important. (r)	-.14 (-.10)	.01 (-.09)	<b>.64 (.64)</b>	-.04 (-.23)
22. I am taking time to figure out what I am really feeling. (r)	-.11 (-.01)	-.00 (.00)	<b>.58 (.55)</b>	.10 (-.06)
<b>Factor 4: Lack of Clarity about Current Emotions (CLARITY)</b>				
19. I am confused about how I feel.	.09 (.47)	.01 (.51)	.07 (-.07)	<b>.76 (.80)</b>
11. I have no idea how I am feeling.	-.07 (.26)	.10 (.36)	-.09 (-.19)	<b>.56 (.60)</b>
<b>Intercorrelations among Factors</b>				
Factor 1: Nonacceptance	-			
Factor 2: Modulate	.70	-		
Factor 3: Awareness	.09	.04	-	
Factor 4: Clarity	.48	.56	-.18	-

*Note.* Structure coefficients are parenthesized. Bolded coefficients load on the relevant factor. (r) indicates an item that should be reverse scored on the S-DERS.

**Table 3**  
Correlations and Partial Correlations between S-DERS Scales and Relevant Constructs

Measure	S-DERS Nonacceptance	S-DERS Modulate	S-DERS Awareness	S-DERS Clarity	S-DERS Total
DERS Nonacceptance	.44**	.43**	.08	.34**	.48**
DERS Awareness	.22**	.20**	.44**	.30**	.42**
DERS Clarity	.35**	.37**	.27**	.46**	.50**
DERS Strategies	.25**	.54**	.09	.32**	.54**
DERS Impulse	.42**	.47**	.08	.29**	.48**
DERS Goals	.31**	.35**	.06	.26**	.35**
DERS Total	.48**	.52**	.19**	.41**	.59**
AIM Negative Intensity/Reactivity	.36**	.35**	-.00	.26**	.36**
TEARS Reduction	-.23**	-.23**	-.16**	-.16**	-.30**
AAQ	.41**	.41**	.14**	.33**	.48**
FFMQ Awareness/Describe	-.26**	-.30**	-.23**	-.32**	-.39**
AUDIT	.05	.18**	.13*	.15**	.17**
DUQ Problems	.10	.19**	.10	.11	.18**
NA Reactivity – Fear Clip <sup>d</sup> (Controlling for DERS)	.26** (.24**)	.23** (.21**)	-.03 (-.04)	.09 (.05)	.23** (.20**)
NA Reactivity – Sadness Clip <sup>d</sup> (Controlling for DERS)	.19** (.17**)	.14* (.10)	.01 (.00)	.05 (.05)	.16** (.13*)
NA Reactivity to Trauma Cue – RPS <sup>d</sup> (Controlling for DERS)	.10 (.06)	.21** (.18**)	.13* (.07)	.16** (.10)	.22** (.18**)
Mean	10.19	10.08	13.14	2.81	36.22
Standard Deviation	5.30	4.49	4.64	1.42	10.75

Note. DERS = Difficulties in Emotion Regulation Scale; AIM = Affect Intensity Measure; TEARS = The Emotion Amplification and Reduction Scale; AAQ = Acceptance and Action Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire; AUDIT = Alcohol Use Disorders Identification Test; DUQ = Drug Use Questionnaire; NA = negative affect.

<sup>d</sup>Partial correlations were calculated for these variables, controlling for baseline NA assessed prior to the task. Partial correlations in parentheses control for both baseline NA and the corresponding original DERS subscale.

;1001;  
\*\*\*  
\*  
*d* < .01. Only *d* values of less than .01 were interpreted as significant.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript